There are some times when an unusual project becomes absolutely unique. That's what happened recently on a water reservoir project on Catalina Island. It had been interesting enough dealing with tour busses and bison during pond construction but when the reservoir made it through a wild fire unscathed it became truly memorable.

The Wrigley reservoir is the main treated water reservoir on Santa Catalina Island, California (Catalina Island). Located on the mountain above the town of Avalon, the reservoir provides treated potable water to the town and other parts of the island.

In 2006 Layfield was invited to replace an existing liner and cover on the Wrigley reservoir. The project included 120,000 ft2 of 45 mil potable water grade Hypalon for the liner and a similar amount for the floating cover. The liner and cover replacement was fairly straight-forward; what made the project unusual was its location and the events that happened later.

Early in 2006 we started fabrication of the liner and cover for the reservoir. As part of our ISO 9001 quality program we performed an inspection of our manufacturer's facilities in Hollister CA. Burke Industries was the manufacturer of the reinforced Hypalon used for this project and they fully met the requirements of our inspection. From there the material went to the Layfield fabrication shop which at the time was also in Hollister. Panels were welded to the custom sizes needed to fit the panel layout of the Wrigley reservoir. There were two things unique about the fabrication. The first was that we used 3 inch wide welds for all welding on these panels. The 3 inch wide weld extended to the edge of the top panel effectively welding down the edge and eliminating a flap on the surface. The other unique aspect was that we rolled these panels up without folds on rolls that were 34 ft wide. Our fabrication shop uses a 36 ft wide winder which allows us to create fabricated cover panels without folds. These rolled panels were then wrapped and shipped to site.

Of all the unusual problems that we had to deal with on this project the biggest problem was logistics. The roads through the town and up the steep mountain road required a truck trailer of no longer than 40 ft. Most truck trailers these days are 45 ft or longer and it took us a while to find trailers that we could rent that were small enough. We even had to buy special insurance so that we could take them onto the barge (ferry) to the island.

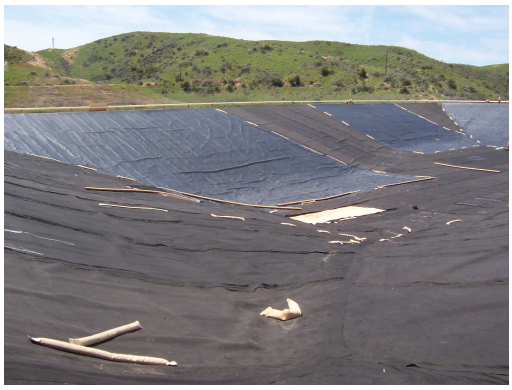
Installation of the liner and cover started in March of 2006. There were a number special considerations required because of the location. Since 1975 most of the island's interior and 48 miles of coastline have been managed by the Catalina Island Conservancy. This organization is tasked with the protection of the island's biological communities and in managing the recreational use of the island. The Wrigley reservoir is in the middle of the conservancy and was surrounded by natural areas. We would have to manage our construction project in the middle of a large nature park. In addition to the regular issues on a construction site we would also have to be aware of tourists and bison.

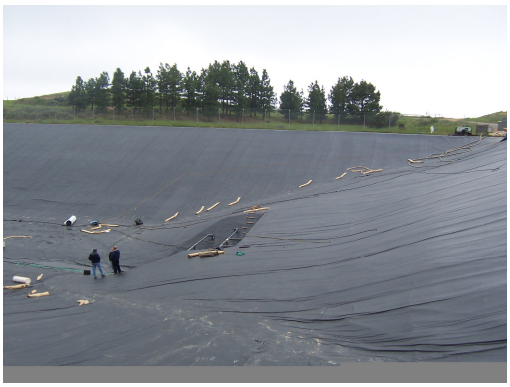
One of the local attractions was a herd of bison that had been left on the island after a film shoot in the 1920's. These bison would wander over to the reservoir periodically. It was important that the gate be kept closed to keep the curious bison out of the construction site. There was also some concern that the bison would damage our fabricated cover panels stored outside the fence. These new panels were covered using strips of material taken out of the old floating cover and the bison did not bother them.

Another unusual requirement was that the job site be kept clean at all times for tourists. Across the road from the reservoir was a lookout that was a very popular stop for the local tour bus companies. It was important that the job site not detract from the view of the island.

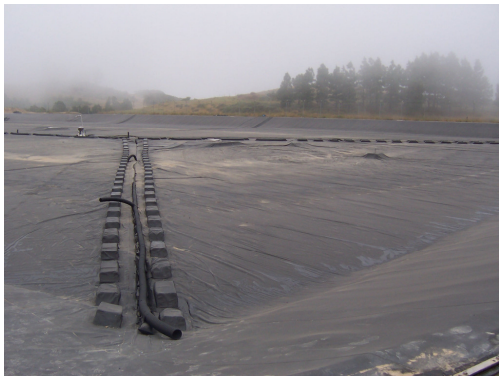
Before the installation of the new liner and cover was started the old cover material had to be removed and disposed. We met with the operators of the local landfill on the island to discuss how to dispose of the cover. They asked us to cut the cover into 4 ft x 5 ft pieces and to stack up and strap them into bundles. Garbage on Catalina Island is compacted before it is placed in the landfill as a landfill space conservation measure. By stacking and strapping the cover pieces we were mimicking the size of the compressed bricks of garbage that would normally go into the landfill.

Once the old cover was removed we placed a geocomposite drainage material over the base tying it into the existing leak detection system. The old liner was left in place and holes were made in the bottom to connect to the leak detection sumps. On top of the geocomposite we placed the 45 mil Hypalon liner. The liner was welded in the field with 3 inch wide welds. A detailed quality plan included periodic destructive test of seams and 100% non destructive testing of all seams with an air lance or a vacuum box. On this job Layfield dedicated a full time technician to the role of quality assurance. Once the liner was installed and tested the cover placement began.





The 45 mil Hypalon cover was placed on top of the completed liner and anchored with the liner to a concrete curb at the top of the pond slope. We re-used the existing anchorage curb and steel batten bars. Once the cover was in place and tested the floats and weights required for a defined sump cover system were laid out and attached. Float covers and straps for prefabricated sand tubes were made from the same Hypalon material as the cover. We had to refurbish as large overflow structure at one end of the pond. This structure had a metal frame roof which we sandblasted and repainted. We also replaced the rainwater removal pumps and painted level markings onto the final cover.



The final step in the construction of a potable water reservoir is to inflate the cover with air for cleaning and disinfection. We build special hatches on the cover that can accommodate blower fans for inflation. Once the fans are placed the cover is inflated so that workers can get underneath. A final cleanup of the space between the liner and the

cover is completed and visual inspection of the cover can reveal if any small defects exist. Then the inside of the cover and liner is sprayed with a bleach solution to disinfect the surfaces. Once this step is complete the reservoir can be put into service. In the Wrigley reservoir case the pond was filled and drained one additional time before it was put back into service.

At this point we had completed a nice upgrade to a water reservoir in the middle of a natural area on Catalina Island without incident. The cover was working well and the client was happy with the work.

On May 10th 2007, a fire broke out on Catalina Island and over a five-day period burned 4,750 acres. The most severe drought in 100 years combined with high winds sustained the fire and swept it across the island. Tragically the fire appeared to have caused by human hands. The Catalina Conservancy is still assessing the impact of the fire on the island ecology.

Since the Wrigley reservoir is the main source of water on the south end of the island it was an important part of the fire fighting. During the fire the reservoir was manned by two people from the water utility. They filled fire trucks directly from the reservoir during the fire. At one point the fire cut off the main road back to the town and they ended up stranded. The fire moved up the mountain and burned around and past the reservoir. The area around the facility is mostly cleared with some grasslands and one stand of trees along one side. The two utility workers took refuge in their vehicle on the downwind side of the reservoir and were unharmed. At the fire's closest approach it would have been about 100 ft from the reservoir.

In the end the fire had burned around three sides of the reservoir without apparent damage to the facility or the floating cover. There was a collection of ash on the cover but no apparent damage. In the weeks after the fire the reservoir remained in use without any measurable decrease in water quality. The floating cover had prevented ash and debris from the fire from getting into the pond so that the reservoir could remain in service.

Inspection after the fire showed that a few small embers had fallen on the cover but were extinguished as soon as they burned a pinhole in the cover. The utility had the reservoir inspect by divers and did a complete inspection of the upper surface but found only a very few defects. There was a layer of ash on the cover but otherwise no significant damage.

Layfield was contacted to come and clean and repair the cover in the summer of 2007. Operational issues required that the water not be drained completely so the repairs were done while the cover was floating. Our crew repaired one hole about the size of a dime and then set about the clean the cover. The entire area was swept and then pressure washed. Water containing the ash and collected debris was pumped from the cover into a small holding pond. There was no other damage to the liner and cover system. The system remained in service throughout the cleaning.

What's interesting about this project is that there have been some concerns about how a floating cover would hold up in an extreme situation such as a fire. This event shows us that a carefully constructed facility with open space around the pond will survive a fire without significant difficulty. This is good news for California where floating covers and fires are both fairly common.